

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Kornbluh, et al.

Application No.: 10/053,511

Filed: January 16, 2002

Title: Variable Stiffness Electroactive Polymer Systems



Attorney Docket No.:
SRI1P035/US-4237-2

Examiner: Unassigned

Group: 2838

2838
RECEIVED
MAY 8 2002
TC 2800 MAIL ROOM

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail to: Commissioner for Patents, Washington, DC 20231 on May 1, 2002.

Signed: Natalie Morgan
Natalie Morgan

INFORMATION DISCLOSURE STATEMENT
37 CFR §§1.56 AND 1.97(b)

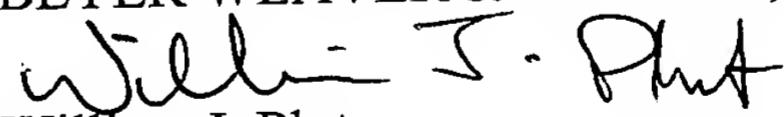
Commissioner for Patents
Washington, DC 20231

Dear Sir:

The references listed in the attached PTO Form 1449, copies of which are attached, may be material to examination of the above-identified patent application. Applicants submit these references in compliance with their duty of disclosure pursuant to 37 CFR §§1.56 and 1.97. The Examiner is requested to make these references of official record in this application.

This Information Disclosure Statement is not to be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, or that these references indeed constitute prior art.

This Information Disclosure Statement is believed to be filed before the mailing date of a first Office Action on the merits. Accordingly, it is believed that no fees are due in connection with the filing of this Information Disclosure Statement. However, if it is determined that any fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. SRI1P035).

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

William J. Plut
Limited Recognition Under 37 C.F.R. 10.9(b)

P.O. Box 778
Berkeley, CA 94704-0778

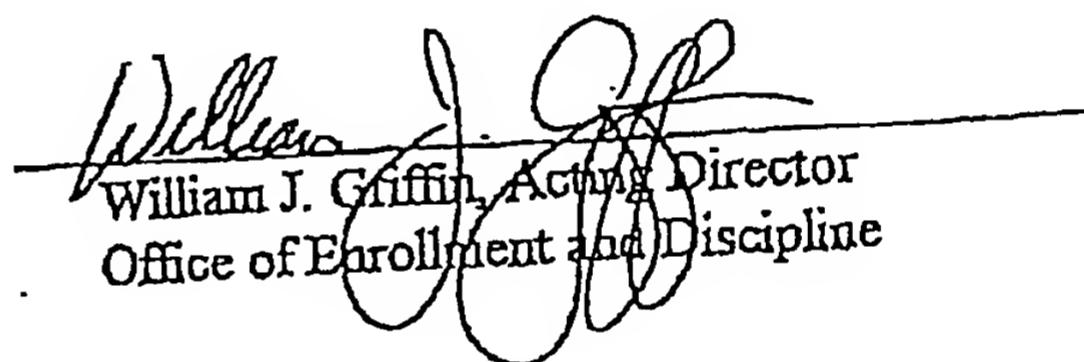
BEFORE THE OFFICE OF ENROLLMENT AND DISCIPLINE
UNITED STATES PATENT AND TRADEMARK OFFICE

LIMITED RECOGNITION UNDER 37 CFR § 10.9(b)

William Plut is hereby given limited recognition under 37 CFR § 10.9(b) as an employee of the Beyer, Weaver, and Thomas, LLP law firm to prepare and prosecute patent applications wherein the patent applicant is the client of the Beyer, Weaver, and Thomas, LLP law firm, and the attorney or agent of record in the applications is a registered practitioner who is a member of the Beyer, Weaver, and Thomas, LLP law firm. This limited recognition shall expire on the date appearing below, or when whichever of the following events first occurs prior to the date appearing below: (i) William Plut ceases to lawfully reside in the United States, (ii) William Plut's employment with the Beyer, Weaver, and Thomas, LLP law firm ceases or is terminated, or (iii) William Plut ceases to remain or reside in the United States on an TN visa.

This document constitutes proof of such recognition. The original of this document is on file in the Office of Enrollment and Discipline of the United States Patent and Trademark Office.

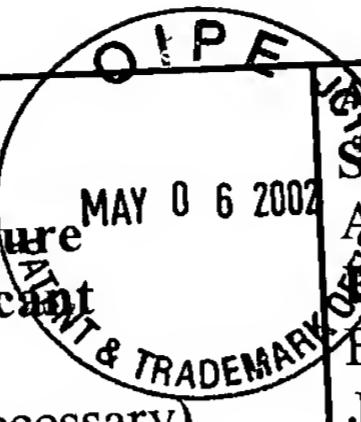
Expires: June 10, 2002


William J. Griffin, Acting Director
Office of Enrollment and Discipline

Form 1449 (Modified)

Information Disclosure
Statement By Applicant

(Use Several Sheets if Necessary)



Attty Docket No.

SRI1P035

Application No.:

10/053,511

Applicant:

Kornbluh, et al.

Filing Date

January 16, 2002

Group

2838

U.S. Patent Documents

| Examiner Initial | No. | Patent No. | Date | Patentee | Class | Sub-class | Filing Date |
|------------------|-----|------------|----------|-------------------|-------|-----------|-------------|
| | A1 | 5,977,685 | 11/02/99 | Kurita, et al. | | | 06/03/96 |
| | A2 | 6,060,811 | 05/09/00 | Fox, et al. | | | 07/25/97 |
| | A3 | 6,249,076 | 06/19/01 | Madden, et al. | | | 04/14/99 |
| | A4 | 4,885,783 | 12/05/89 | Whitehead, et al. | | | 04/10/87 |

Other Documents

| | | |
|------------------|-----|--|
| Examiner Initial | No. | Author, Title, Date, Place (e.g. Journal) of Publication |
| | B1 | Ashley, S., "Smart Skis and Other Adaptive Structures", <i>Mechanical Engineering</i> , November 1995, pp. 77-81 |
| | B2 | Bar-Cohen, Yoseph, JPL, <i>Worldwide Electroactive Polymers, EAP (Artificial Muscles) Newsletter</i> , Vol. 3, No.1, June 2001 |
| | B3 | Bharti, V., H. S. Xu, G. Shanthi, and Q. M. Zhang, "Polarization and Structural Properties of High Energy Electron Irradiated Poly(vinylidene fluoride-trifluoroethylene) Copolymer Films," to be published in <i>J. Appl. Phys.</i> (2000). |
| | B4 | Bobbio, S., M Kellam, B. Dudley, S. Goodwin Johansson, S. Jones, J. Jacobson, F. Tranjan, and T. DuBois, "Integrated Force Arrays," in Proc. IEEE Micro ElectroMechanical Systems Workshop, Fort Lauderdale, Florida February 1993. |
| | B5 | Calvert, P. and Z. Liu, "Electrically stimulated bilayer hydrogels as muscles," Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA, pp. 236-241. |
| | | |
| | | |
| Examiner | | Date Considered |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Form 1449 (Modified)

Information Disclosure
Statement By Applicant

(Use Several Sheets if Necessary)

Atty Docket No.

SRI1P035

Applicant:

Kornbluh, et al.

Filing Date

January 16, 2002

Application No.:

10/053,511

Group

2838

Other Documents

| Examiner Initial | No. | Author, Title, Date, Place (e.g. Journal) of Publication |
|------------------|-----|---|
| | C1 | Elhami, K., and B. Gauthier-Manuel, "Electrostriction Of The Copolymer Of Vinylidene-Fluoride And Trifluoroethylene," <i>J. Appl. Phys.</i> Vol. 77 (8), 3987-3990, April 15, 1995. |
| | C2 | Hirose, S., Biologically Inspired Robots: Snake-like Locomotors and Manipulators, " <i>Development of the ACM as a Manipulator</i> ", Oxford University Press, New York, 1993, pp.170-172. |
| | C3 | Kornbluh, R., G. Andeen, and J. Eckerle, "Artificial Muscle: The Next Generation of Robotic Actuators," presented at the Fourth World Conference on Robotics Research, SME Paper M591-331, Pittsburgh, PA, September 17-19, 1991. |
| | C4 | Kornbluh, R., R. Pelrine, J. Joseph, "Elastomeric Dielectric Artificial Muscle Actuators for Small Robots," <i>Proceedings of the Third IASTED International Conference on Robotics and Manufacturing</i> , June 14-16, 1995, Cancun, Mexico. |
| | C5 | Kornbluh, R., Pelrine, R., Eckerle, J., Joseph, J., "Electrostrictive Polymer Artificial Muscle Actuators", IEEE International Conference on Robotics and Automation, Leuven, Belgium, 1998 |
| | C6 | Kornbluh, R., R. Pelrine, Jose Joseph, Richard Heydt, Qibing Pei, Seiki Chiba, 1999. "High-Field Electrostriction Of Elastomeric Polymer Dielectrics For Actuation", Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA. pp. 149-161. |
| | C7 | Kornbluh, R. D and R. E. Pelrine., "Kornbluh, R., R. Pelrine, Q. Pei, S. Oh, and J. Joseph, 2000. "Ultrahigh Strain Response of Field-Actuated Elastomeric Polymers," Proceedings of the 7 th SPIE Symposium on Smart Structures and Materials-Electroactive Polymers and Devices (EAPAD) Conference, March 6-8, 2000, Newport Beach, California, USA, pp. 51-64 |
| Examiner | | Date Considered |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

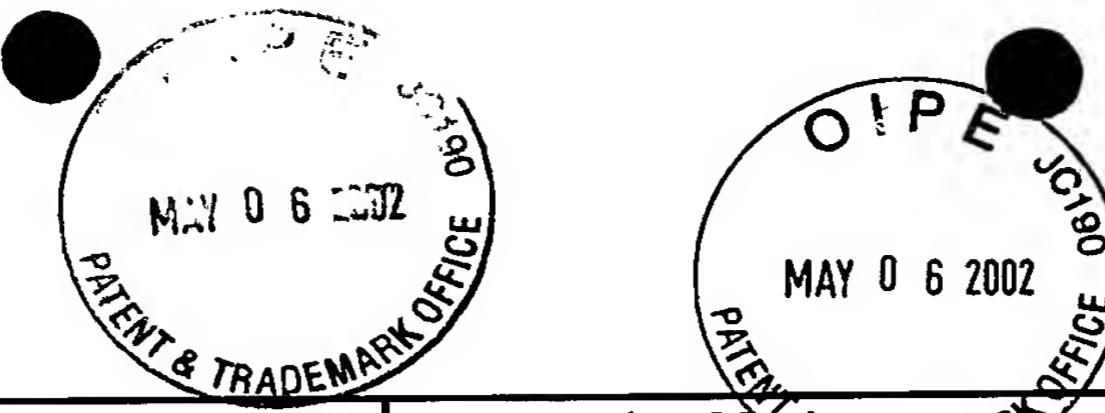


| | | | |
|--|--|---|---|
| Form 1449 (Modified) Information Disclosure Statement By Applicant (Use Several Sheets if Necessary) | | Atty Docket No. SRI1P035 Applicant: Kornbluh, et al. Filing Date January 16, 2002 | Application No.: 10/053,511 Group 2838 |
|--|--|---|---|

Other Documents

| Examiner Initial | No. | Author, Title, Date, Place (e.g. Journal) of Publication |
|------------------|-----|---|
| | D1 | Liu, C., Y. Bar-Cohen, and S. Leary, "Electro-statically stricted polymers (ESSP)," Proceedings of the SPIE International Symposium on Smart Structures and Materials: Electro-Active Polymer Actuators and Devices, March 1-2, 1999, Newport Beach, California, USA., pp. 186-190. |
| | D2 | Ohara, K., M. Hennecke, and J. Fuhrmann, "Electrostriction of polymethylmethacrylates," <i>Colloid & Polymer Sci.</i> Vol 280, 164-168 (1982). |
| | D3 | Pei <i>et al.</i> , "Improved Electroactive Polymers", U.S. Patent Application No. 09/619,847, filed July 20, 2000, 70 pages |
| | D4 | Pelrine, R., R. Kornbluh, and Q. Pei. "Electroactive Polymer Transducers And Actuators", U.S. Patent Application No. 09/620,025, filed July 20, 2001, 58 pages. |
| | D5 | Pelrine, R. and Kornbluh, "Electroactive Polymer Devices," U.S. Patent Application No. 09/619,846, filed July 20, 2000, 69 pages |
| | D6 | Pelrine, R, R. Kornbluh, J. Joseph, and S. Chiba, "Electrostriction of Polymer Films for Microactuators," <i>Proc. IEEE Tenth Annual International Workshop on Micro Electro Mechanical Systems</i> , Nagoya, Japan, January 26-30, 1997, pp. 238-243. |
| | D7 | Pelrine, R., R. Kornbluh, and J. Eckerle. "Energy Efficient Electroactive Polymers and Electroactive Polymer Devices", U.S. Patent Application No. 09/779,373, filed February 7, 2001. |
| Examiner | | Date Considered |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



| | | | |
|--|--|--|---|
| Form 1449 (Modified) Information Disclosure Statement By Applicant (Use Several Sheets if Necessary) | | Atty Docket No. SRI1P035 Applicant: Kornbluh, et al. Filing Date January 16, 2002 | Application No.: 10/053,511 Group 2838 |
|--|--|--|---|

Other Documents

| Examiner Initial | No. | Author, Title, Date, Place (e.g. Journal) of Publication |
|------------------|-----|---|
| | E1 | Pelrine, R., R. Kornbluh, and J. Joseph, <i>FY 1998 Final Report on Artificial Muscle for Small Robots</i> , ITAD-3482-FR-99-36, SRI International, Menlo Park, California, 1999 |
| | E2 | Pelrine, R., R. Kornbluh, and J. Joseph, <i>FY 1999 Final Report on Artificial Muscle for Small Robots</i> , ITAD-10162-FR-00-27, SRI International, Menlo Park, California, 2000 |
| | E3 | Pelrine, R., R. Kornbluh, Q. Pei, and J. Joseph, "High Speed Electrically Actuated Elastomers with Over 100% Strain," <i>Science</i> , Vol. 287, No. 5454, pages 1-21, 2000 |
| | E4 | Pelrine, R., Roy Kornbluh, Jose Joseph, Qibing Pei, Seiki Chiba "Recent Progress in Artificial Muscle Micro Actuators," , SRI International, Tokyo, 1999 MITI/NEEDOIMNIC, 1999 |
| | E5 | Pelrine, R., J. Eckerle, and S. Chiba, "Review of Artificial Muscle Approaches," invited paper, in <i>Proc. Third International Symposium on Micro Machine and Human Science</i> , Nagoya, Japan, October 14-16, 1992 |
| | E6 | Smela, E., O. Inganäs, and I. Lundström, "Controlled Folding of Micrometer-size Structures," <i>Science</i> , Vol. 268, pp. 1735-1738 (23 June 1995). |
| | E7 | Uchino, K. 1986. "Electrostrictive Actuators: Materials and Applications," <i>Ceramic Bulletin</i> , 65(4), pp. 647-652, 1986 |
| | E8 | Pelrine <i>et al.</i> , "Electroactive Polymer Generators", U.S. Patent Application No. 09/619,848, filed July 20, 2000, 69 pages |
| | E9 | Pelrine, R., R. Kornbluh, J. Eckerle "Monolithic Electroactive Polymers" U.S. Patent Application No. 09/779,203 filed February 7, 2001 |
| | E10 | Kornbluh, R., R. Pelrine, Q. Pei and J. Eckerle "Electroactive Polymer Sensors", U.S. Patent Application No. 10/007,705, filed December 6, 2001. |
| | | |
| | | |
| Examiner | | Date Considered |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



| | | | |
|--|--|--|---------------------------------------|
| Form 1449 (Modified) Information Disclosure Statement By Applicant (Use Several Sheets if Necessary) | | Atty Docket No. SRI1P035 | Application No.: 10/053,511 |
| | | Applicant: Kornbluh, et al. | |
| | | Filing Date January 16, 2002 | Group 2838 |

Other Documents

| Examiner Initial | No. | Author, Title, Date, Place (e.g. Journal) of Publication |
|------------------|-----|---|
| | F1 | Pelrine, R. R. Kornbluh, J. Eckerle, S. Stanford, S. Oh and P. Garcia, "Biologically Powered Electroactive Polymer Generators", U.S. Patent Application No. 09/792,877, filed February 23, 2001 |
| | F2 | Lakes, R.S., "Extreme damping in compliant composites with a negative stiffness phase", Philosophical Magazine Letters, 81, 95-100 (2001) |
| | F3 | Lakes, R.S., "Extreme Damping in Composite materials with a negative stiffness phase", Physical Review Letters 86, 2897-2900, 26 March (2001). |
| | F4 | Lakes, R.S., Lee, T., Bersie, A., and Wang Y.C., "Extreme damping in composite materials with negative stiffness inclusions", Nature, 410,565-567 March (2001). |
| | F5 | Pei, Qibing, R. Pelrine, R. Kornbluh, S. Jonasdottir, V. Shastri, R. Full, "Multifunctional Electroelastomers: Electroactive Polymers Combining Structural, Actuating, and Sensing Functions, ITAD-433-PA-00-123, available at www.sri.com-publications , January 17, 2001. |
| | F6 | Kornbluh, R., R. Pelrine, Q. Pei and V. Shastri "Electroactive Polymer (EAP) Actuators as Artificial Muscles - Reality, Potential and Challenges", Chapter 16, available from SPIE Press on May 2001. |
| Examiner | | Date Considered |
| | | |
| | | |
| | | |
| | | |

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.